

THE OCEAN ALLIANCE

Voyage of the Odyssey

Cruise Report No.1

4-22 April 2000



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Dirección General de Intereses Marítimos de la Armada Nacional
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Introduction

The Ocean Alliance initiated research activities on cetaceans in waters of the Galápagos Marine Reserve in April 2000, aboard the research vessel *Odyssey*. The *Odyssey* arrived in Puerto Ayora on 2 April 2000, after a 16-day transit from San Diego, California, USA. The proposed investigation has the following components:

1. Toxicology studies on sperm whales. Collaborators: John Stegeman and Michael Moore, Woods Hole Oceanographic Institution.
2. Genetic studies on sperm whales. Collaborators: Sarah Mesnick, Southwest Fisheries Science Center, and Bill Amos, Cambridge University.
3. Photo-identification studies on sperm whales. Collaborator: Hal Whitehead, Dalhousie University.
4. Acoustic studies on sperm whales. Collaborators: Chris Clark, Cornell University, and Jonathan Gordon and Doug Gillespie, International Fund for Animal Welfare.
5. Cetacean distribution, abundance and relationship to oceanographic processes around the Galápagos. Collaborator: Daniel Palacios, Oregon State University.

In addition, the Ocean Alliance runs a media, education, and communication program from aboard the R/V *Odyssey* called “A Voice from the Sea”. The mission of this program is to bring the results of the scientific projects to the general public via a network-based, interactive web site, with the ultimate objective of educating the public and increasing marine conservation awareness worldwide.

These activities are being conducted under authorization from the Galápagos National Park (Proyecto No. PC-32-00 of 11 February 2000, with Alcance a la autorizacion original of 13 March 2000) and from the Dirección General de la Marina Mercante y del Litoral (Autógrafo: Acuerdo No. 018/00 of 27 March 2000).

Report of cruise activities

The first cruise took place between 4-22 April 2000, with Daniel Palacios as chief scientist. The primary objective of the cruise was to conduct a survey of cetacean abundance and distribution in relation to oceanographic processes on the western side of the archipelago. (Hereafter this survey is referred to as “GalCet2K”). In addition, some effort was spent working with sperm whales on the toxicology, genetic, photo-identification, and acoustic studies. These activities were covered by the education, media, and communication staff, as reported below.

GalCet2K. A survey for cetacean abundance with concurrent oceanographic sampling took place between 5-19 April, with the goal of characterizing cetacean abundance and distribution with respect to a gradient in temperature and biological production. The area selected for the survey was a 3°x2° box approximately 74,166 km², designed to encompass the warm, oligotrophic waters to the north of the Equatorial Front (located at ~1°N) as well as the cool, productive waters to the west of the islands, where the

Equatorial Undercurrent upwells. The original boundaries of this box were set to extend from 92-94°W of longitude and 2°N-1°S of latitude, based on the long-term sea-surface temperature climatology. Five days into the survey, however, it was decided to move the meridional boundaries of the box to 91°20'-93°20'W, to best cover the features of interest, after examining near-real-time satellite imagery of ocean color and temperature sent by Gene Feldman at NASA. Survey tracklines followed a north-south zig-zag pattern. There were 12 trackline segments, each one being 90 n.mi. long (~167 km), for a total of 1,080 n.mi. (~2,000 km). Figure 1 illustrates the final trackline layout and the tracklines actually surveyed. An image of ocean color for 30 March 2000 is included in Figure 2, to show the distribution of surface phytoplankton in the study area.

Cetacean surveying was conducted from an observation platform located 5.6 m above sea level, with a maximum sighting distance to the horizon of 4.56 n.mi. (8.45 km). Surveying effort was conducted at a nominal cruising speed of 8.5 knots, employing standard line-transect techniques. Experienced cetacean observers maintained a visual watch during daylight hours (0600-1800 h), using 7x binoculars to scan the area 180° forward to the ship to the horizon. An observer team of four people rotated every hour through three stations: port observer, starboard observer, and data recorder. For each cetacean sighting, bearing (angle from the trackline, measured with an azimuth ring) and distance (calculated using the calibrated reticle scale in the binoculars) were recorded. Weather conditions related to sightability (sea state, swell, meteorological conditions) and navigation data were also recorded. Cetacean sightings within one nautical mile from the trackline were approached to obtain species identification and to estimate school size. All data were entered into a laptop computer running the software WinCruz v. 5.2.1. Data on seabird, turtles and sharks seen at the surface were also regularly collected as part of the survey protocol.

The structure of water column properties (temperature, salinity, density and phytoplankton standing stock) along the track was measured with CTD/fluorometry casts. A total of 32 casts were completed, as shown in Figure 1. Sea-surface temperature along the track was recorded at a sampling rate of eight minutes. Biological samples were opportunistically collected at the surface from dead squid and fish. These samples have been labeled and preserved and will be useful in studies of potential prey for cetaceans. A more detailed report of the results of GalCet2K will be submitted at a later date.

Sperm whale work. Although sperm whales were occasionally observed during the GalCet2K survey, dedicated effort was not conducted until after the end of the survey. Two days (20-21 April) were entirely spent on sperm whale visual and acoustic monitoring (using a towed hydrophone array and the software Rainbow Click). In total, seven acoustic transects were performed, during which 13 acoustic contacts with sperm whales were recorded. Eight sperm whale sightings were made during daylight hours, on 2, 17, 18, 19, 20 and 21 April. Four biopsy samples were collected on 20 April. Figure 3 shows the distribution of the acoustic transects, acoustic contacts, sightings, and biopsy sampling locations. Photographs of individuals identified with a digital camera are presented in Figures 4 and 5.

Education, media, and communication program. Continued connection between the R/V *Odyssey* and the outside world during this cruise was maintained through our web site, <http://www.oceanalliance.org>. The following activities were completed:

- Seven audio logs – internet audio updates relating to daily occurrences on the *Odyssey* and the science and research being completed onboard usually accompanied by a daily image.
- Two “Voice from the Sea” audio pieces – weekly narratives by Dr. Roger Payne.
- Three video logs – internet video updates related to the science and research completed on the *Odyssey* as well as surrounding events.
- Five questions of the day – The onboard education coordinator supports Dr. Roger Payne’s “Voice from the Sea” with questions based on his most recent audio piece.

Acknowledgements

The Galápagos National Park and the Dirección General de la Marina Mercante y del Litoral authorized our research activities in the waters of the Galápagos Archipelago. Poly Robayo, Jenni Thompson and Edwin Yanez of the Charles Darwin Research Station provided invaluable logistic support. The port captains of Santa Cruz and Seymour islands kindly processed our *zarpe* paperwork. TAME airlines provided discounted air travel between the Galápagos and continental Ecuador.

We thank the rest of crew of the R/V *Odyssey*: Bob Wallace, Alison Walker and Daniel McBride for ensuring a successful operation. This cruise was funded by the Oregon State University Marine Mammal Endowment Fund (through Bruce Mate), Cetacean Society International (through Bill Rossiter) and the Ocean Alliance (through Iain Kerr). The following individuals kindly loaned vital equipment: Scott Pegau (CTD instrument), Paul Fiedler and Valerie Philbrick (fluorometer), Tim Gerrodette (binoculars), Jay Barlow (azimuth rings). Robert Holland and Sarah Mesnick ensured we had a running version of the WinCruz software for collecting the line-transect data. Gene Feldman provided near-real time ocean color and sea-surface temperature satellite imagery that enhanced our trackline design.

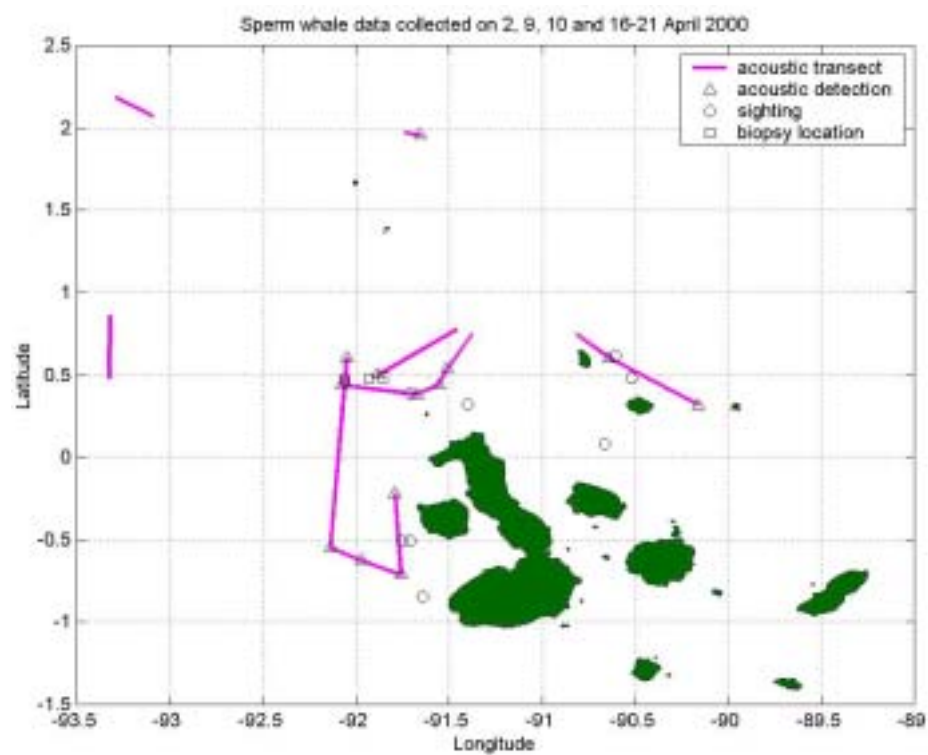
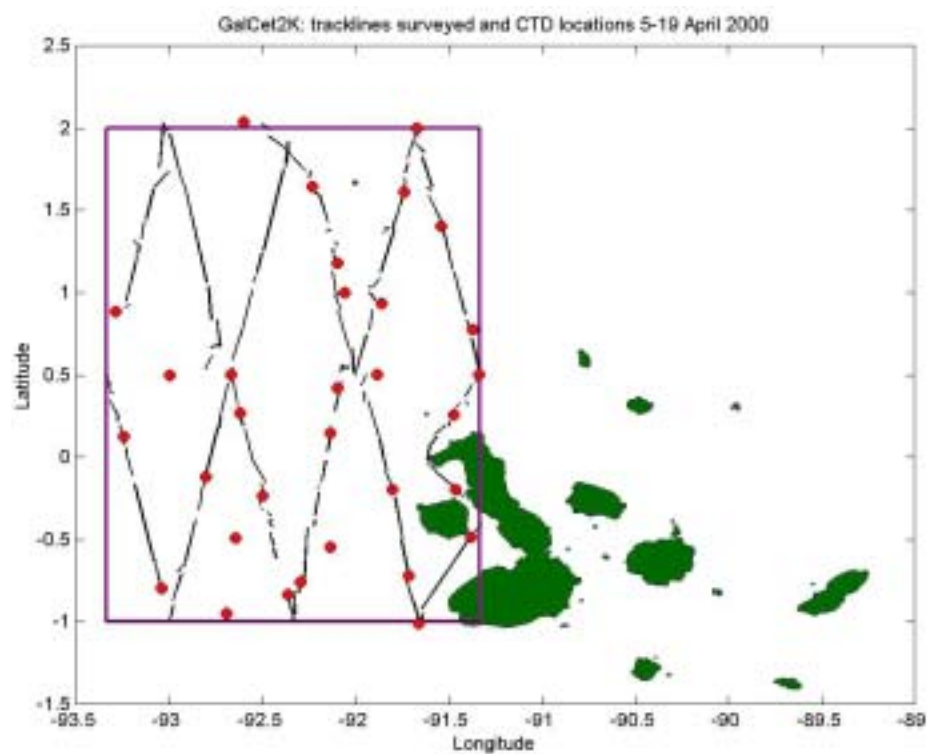


Figure 3. Sperm whale data collected during Cruise No. 1.



Date: 2 April 2000, Time: 0630 h, Latitude: 0°05.5'N, Longitude: 90°39.8'W
Not biopsied.

Figure 4. Sperm whale individually identified. Note the two very striking white stripes on the right side of its flank, forward of the dorsal fin in the top image. Photos by Chris Johnson.



Whale A: not biopsied. Date: 20 April 2000, Time: 1121 h,
Latitude: 0°28.8'N, Longitude: 91°54.6'W



Whale B: Biopsy No. GP2000-0420-002 . Date: 20 April 2000,
Time: 1141 h, Latitude: 0°28.8'N, Longitude: 91°54.7'W

Figure 5. Photos by Chris Johnson